

California State Journal of Medicine

OWNED AND PUBLISHED MONTHLY BY THE MEDICAL SOCIETY OF THE STATE OF CALIFORNIA

BALBOA BUILDING, SECOND AND MARKET STREETS, SAN FRANCISCO

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VOL. XX

SEPTEMBER, 1922

No. 9

ORIGINAL ARTICLES

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RECENT DEVELOPMENTS IN RADIO-THERAPY.*

By REX DUNCAN, M. D., Los Angeles, Cal.
(From the Radium and Oncologic Institute.)

Radiotherapy, or the treatment of diseases by means of radiation, is based upon the fact that certain histological and bio-chemical changes are produced in the body tissues by rays capable of penetrating the tissues. This effect varies with the character, quality and quantity of radiation applied, and may be stimulating or destructive. All tissues are affected, but there is a hyper-susceptibility of neoplastic or newly formed tissues. Generally speaking, the resistance is greater the more nearly the newly formed tissues histologically resemble normal, and a proportionately greater susceptibility in the more rapid growing and less perfectly formed types. However, a wide variation in susceptibility of tissues has been noted by all careful observers, and was further demonstrated by careful research conducted by Wood, demonstrating quite conclusively that it is impossible to establish a so-called lethal dose for cancer.

The histological changes that occur have been carefully studied by ourselves and numerous observers. We have, for some time, been grading our tumors according to the grouping suggested

by A. C. Broders, and noting their susceptibility. This work, which will be published in detail later, gives a more comprehensive understanding of the biological effect of irradiation and suggests certain improvements in technique and the possibility of a more definite prognosis. The precise cause of these histological changes due to irradiation has not been determined. Whether or not it is due to the direct effect of the radiation on the neoplastic elements or secondary to the changes produced in the normal tissues, or a systemic effect or a combination of these and other changes, is a matter for further research. That destructive changes do occur in certain types of neoplasms consistent with the dosage and technique employed, is a well-established fact.

The rapid development and excellent results obtained with radium therapy have been due largely to the fact that with radium we possess a constant and definite source of energy and a very thorough understanding of its physical properties. The mechanical and physical problems of X-ray equipment have recently been developed to the point where we now have equipment, both machines and tubes, capable of operating under high voltage, and means of accurately measuring at all times the voltage employed. The character and quality of X-rays produced are dependent upon the voltage passing through the X-ray tube. The greater the voltage employed, the larger quantity of short-wave length or more highly penetrating rays produced, the intensity increasing as the square of the voltage.

Modern deep X-ray therapy has been made possible by the physicist and electrical engineer, who, through scientific research, have given us, first, Roentgen ray tubes, which will stand very high voltage continuously, and, second, the development of electrical apparatus which would generate safely high voltages with great reliability and safety from breakdown, and, third, physical measurements which enable us with certain technique to know quite accurately the character and quantity of radiation, and the percentage and distribution of intensity at various depths within the body.

The several factors governing the quantity and quality of the therapeutic application of X-rays are the type of equipment employed, the voltage, milamperage, screen or filter, skin distance, port of entry and time. Varying these factors, Des-sauer, by elaborate physical researches, compiled

* Read before the New Mexico Medical Society, April 28, 1922, at Gallup, New Mexico; also before the California State Medical Society, at Yosemite, May 15, 1922.

EDITORIALS

NEW OFFICES OF THE STATE SOCIETY

The Society was notified on July 11, 1922, by the agents of the Butler building that the rent would be materially increased, and in order that the present offices might be held a lease for three years would have to be signed (in our case) by individual doctors. The general counsel for the Society refused to give his permission for the signing of such a lease by individuals, and, inasmuch as the lease could not be signed, the Society was compelled to look for other rooms.

Suitable offices have been found in the Balboa building, rooms 1015, 1016 and 1017, at Second and Market streets, just below the Palace Hotel, where it has been found that three rooms will suffice—four being occupied in the Butler building—at a material reduction in rental. In the new offices it will be feasible to use one less telephone than we are using at present, so that the move from all standpoints is advantageous, as the League for the Conservation of Public Health is at present located in this building because of the same circumstances.

THE PHYSICIAN AND "PRIVILEGED COMMUNICATIONS"

The confidences between patient and physician in all countries and in all times have partaken somewhat of the confessional. In most civilized countries and in practically all so-called non-civilized countries these confidences have been and are respected by law. In some of the States of the United States a physician is not permitted to testify as to knowledge obtained in his professional capacity. In other States and in other countries only certain classes of information are covered by the "privileged communication" provision of the law. In a few cases privileged communication is not recognized and physicians are required to testify regardless of the injury that such testimony may do to patients and family and regardless of the manner in which their information is received. This problem in general has been very well taken care of until the last few years. The development of State medicine and socialized medicine in its various forms struck a great blow to privileged communications between physician and patient. This is well illustrated in the Workmen's Compensation and Industrial Insurance Acts in various States. Other laws have been passed, one after the other, which in the aggregate have constantly restricted privileged communications, confidences that should be sacred between the sick patient and the physician. One of the latest inroads into this sacred covenant has been found in Great Britain, where it is generally known that State Medicine is in full bloom, so full in fact that most of the attractive petals are withered and falling from the flower. The British Medical Association in its recent convention condemned the destruction of the principle of the sacred covenant between

patient and physician in measured terms. They recommended passage of legislation restoring to physicians of Great Britain the right to receive the confidence of their patients and to keep such confidences inviolate.

The Anti-Vivisectionists—The anti-vivisectionists are at it again. They have an initiative measure on the ballot this fall under which you may not perform an experiment on an animal, even under anesthetic or without pain, if the purpose is scientific investigation, but you may cut an animal open, mutilate or burn it, painfully and without anesthetic, if the purpose is convenience in farming. The law expressly says both of these things, in direct language. Animals may be caught alive, in steel traps, or shot and wounded, for sport or profit; they may be killed for food, painfully; they may be branded with hot iron, to identify them as property, or dehorned, gelded, spayed, castrated or caponized, without anesthetic, for convenience or luxury, and there is no law against it. In fact, these farming operations are expressly permitted, in this language, by the law. But the surgeon with a delicate and perhaps new operation to perform may not perfect his technique by doing it first on an animal, even under complete anesthesia. No drug may be tested, by administering it to an animal, first. No serum, to protect children against diphtheria, or even to protect other animals against anthrax or hog cholera, can be manufactured or tested.

A human being bitten by a mad dog must die of hydrophobia since the only known treatment involves inflicting a needle-prick on a rabbit, and this is forbidden. The botulinus investigations, without which the California fruit-canning industry would be ruined, are forbidden. It is forbidden to investigate the poisoning of orchard pests or their extermination by their natural enemies, or even to make experimental investigation of the diseases of plants. Present methods of combating anthrax and hog cholera are made penal offenses, and the treatment of diphtheria, lockjaw and meningitis by the methods approved by modern science are forbidden. The teaching of medicine, physiology and biology in the universities of California is made impossible. And a thousand other things, equally absurd.

And all this, not to protect animals from pain—since animal experimentation is prohibited even when there is no pain, while the infliction of pain is permitted, if it is for other purposes—but to prevent scientific investigation.

The thing is almost unthinkable preposterous. No such law exists or has ever been seriously proposed in any civilized country. And yet there will be a real crusade for it, by people who think they are sincere, in California.—Chester Rowell, in S. F. Bulletin.

NEW MEDICAL JOURNAL

A new medical Journal, known as the "American Medical Press," a monthly medical publication, came off the press in June. This Journal emphasizes the importance of medical economics and the duty of the physician as a citizen. Dr. F. H. McMechan is editor; Harvey S. Knox, business manager. The Journal is published by the New York Press, 280 Broadway, New York City.

Thank You—Dear Doctor Musgrave: Just a note to congratulate you upon having accomplished the Herculean task of shortening the papers in the California State Journal. I think it must increase the interest in the Journal, and it will enable many more to be heard when they want a hearing. I noticed a while back one of the Canadian Journals has a large number of articles, all about a page and a half long.—Walter C. Alvarez